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ABSTRACT

A study investigated the role of certain discourse and language processing factors in the production of narratives under controlled conditions. Subjects watched a short segment from a movie and then narrated the events to a researcher. The narrations were taped, transcribed, and analyzed in terms of such factors as: (1) the number and types of clauses used (markedness); (2) the distribution of given and new information; (3) the relative orders of main and subordinate clauses (closure); and (4) the types of structures used to encode foreground and background events (iconicity). Results indicate that the given/new constraint, markedness, and closure are all relevant in the narratives, but that iconicity is not. Moreover, certain high transitivity features tend to correlate strongly with foreground events. It is concluded that certain principles originally proposed for language comprehension are also involved in language production. It is also found that the method used to elicit information from the subjects does produce non-random results. (MSE)

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DISCOURSE AND PROCESSING CONSTRAINTS ON THE PRODUCTION OF CONTROLLED NARRATIVES[1]

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Abstract

The present study explores the function of certain discourse and processing factors in the production of narratives under controlled conditions. Subjects in an experiment watched a short segment from a movie and then narrated the events to an experimenter. The narrations were taped, transcribed, and analysed in terms of such factors as (a) the number and types of clauses used, (b) the distribution of given and new information, (c) the relative orders of main and subordinate clauses, and (d) the types of structures used to encode foreground and background events. It is found that the given-new constraint, markedness, and closure are all relevant in the narratives, but that iconicity is not. Moreover, certain high transitivity features tend to correlate strongly with foreground events. It is concluded that certain principles originally proposed for language comprehension are also involved in language production.

Introduction

Most psycholinguistic research dealing with adult language processing has focused on comprehension, with only modest attention directed toward language production. The reason for this unbalance is simply that comprehension is easier to study than production, even though the objects of comprehension, namely mental representations, are less accessible than those of production, namely utterances or texts. This paper, intended as a further contribution to the study of language

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production, has two purposes: to offer a methodological contribution, and to assess the roles within production of certain principles and constraints which have been shown to be relevant in language comprehension.

Although much of the early work in language comprehension took the isolated sentence as the basic unit for analysis, later studies began to address discourse factors as well. It is now generally recognized that a full understanding of language processing must address both *linguistic* factors and the *cognitive principles* involved in processing. These latter range from those associated with specific cognitive capacities (e.g., working memory) to more general principles grounded in our cognitive architecture.

An important issue in the study of language processing is the extent to which factors relevant to language comprehension are also involved in production. While production and comprehension are clearly not "mirror images" of each other, it is plausible that they do share some constraints in common. One way to examine this question is to assess certain well-established comprehension factors to determine just what roles, if any, they play in production. From among the numerous factors which are arguably relevant in comprehension, the following four constraints[2] have been selected for investigation here since their supporting evidence seems quite secure:

> **CLOSURE**: constituents tend to be closed as early as possible; interrupted structures are typically harder to process than non-interrupted ones (Slobin, 1973; Kimball, 1973; Frazier, 1978; Prideaux & Baker, 1986).
>
> **MARKEDNESS**: structures in the canonical form ("unmarked") are easier to processes than those which deviate from the normal form ("marked") (Clark & Clark, 1977).

ICONICITY: structures which more directly mirror or map the events they represent are easier to process than those which do not (Haiman, 1985).

GIVEN-NEW: "given" information (shared by speaker and hearer) is systematically separated from "new" (unknown to the hearer); and the distribution of given and new information is systematically encoded by a variety of means in a language. A sentence which violates the expected Given-New distribution is harder to comprehend than one which does not (Clark & Haviland, 1977; Clark & Clark, 1977; Prideaux & Baker, 1986; Smyth, 1988).

The first of these, CLOSURE, is a *local* constraint, taking as its domain the clause. It suggests, among other things, that a clause which has an internally interrupting clause (as 1a) should, all else being equal, be harder to process than one which does not (1b).

1 a. That Fred broke the vase disturbed the salesman.
  b. It disturbed the salesman that Fred broke the vase.

CLOSURE follows from the principle that it is more demanding of resources to process two (or more) similar units simultaneously than to process them one at a time. Thus, for complex clauses, serial rather than nested processing is preferred.

According to MARKEDNESS, sentences with unmarked word orders (such as 2a) should be easier to comprehend than those with the marked order (2b).

2 a. John went to the store in order to buy an apple.
  b. In order to buy an apple, John went to the store.

This constraint is also local, since it depends on the form of the sentence in isolation.

Haiman (1985) has argued that much of language is not as arbitrary as tradition suggests, but rather that certain aspects of grammar stand in an *iconic* relation with the events and actions they represent. For example, the so-called "order of mention" constraint suggests that when a compound or complex sentence represents two ordered events, the

"natural" order of clauses is one mirroring the order of events. According to ICONICITY a structure which is iconic with respect to the events it represents (3a) should be easier to process than one which is not (3b).

3 a. John walked to the corner before he lit his cigarette.
b. Before he lit his cigarette, John walked to the corner.

Finally, the GIVEN-NEW constraint deals with the organization and representation of given and new information within a sentence as it is situated within a larger context. For example, it has been argued that within English, Given information typically precedes New (Clark & Haviland, 1977; Clark & Clark, 1977; Smyth, Prideaux, & Hogan, 1979), and that within complex sentences, Given information is more typically found in subordinate clauses and New information in main clauses (Bever, 1970). This constraint has received a great deal of investigation over the past decade or so.

To these four general constraints a fifth can be added, namely one which deals with the ways in which foreground and background information are encoded within texts. This constraint is also global in the sense that its application depends on a determination of which events are central and which are peripheral. Arising primarily from the analysis of texts, the constraint can be formulated as follows:

> **TRANSITIVITY**: Foreground information tends to be encoded with structures high in transitivity properties while background information is encoded in low transitivity structures (Hopper & Thompson, 1980; Tomlin, 1985).

It has been argued that high transitivity is coded by such features as present tense, punctual verbs, and residence in main rather than subordinate clauses, as well as variety of other factors. A major

problem in this area is that an independent means is required to identify foreground and background information. Indeed, it has been a singular difficulty with such studies that foreground events have either been identified intuitively or in terms of the very factors which are claimed to mark foregrounding. Before the TRANSITIVITY hypothesis can be assessed, foreground and background information must be independently determined. Some predictions as to the effect of each factor in oral narrative text productions are spelled out in Table 1.

Table 1. Predictions

Factor	Predictions
CLOSURE	There should be significantly more non-interrupting than interrupting subordinate clauses.
MARKEDNESS	Within complex sentences, there should be significantly more with word order MC+SC than with order SC+MC.
ICONICITY	In representing ordered events, there should be more structures with the first event first than with second event first.
GIVEN-NEW	a. In main clauses, constituents representing Given information should be ordered before those representing New information. b. In complex sentences, subordinate clauses should typically contain Given information, while main clauses should typically contain New information.
TRANSITIVITY	Events judged to be foregrounded should be encoded with "high transitivity" features (in main clauses, punctual) while backgrounded events should be encoded with "low transitivity" features (progressive aspect, etc.).

In order to assess the predictions, an experiment was undertaken in which oral narrative language was elicited under controlled conditions. It is to a description of this experiment that we now turn.

The Experiment

One method which has been used to assess language production involves having subjects watch a video or movie segment and provide a narrative of the events, either "on-line" as the scenes unfold (e.g., Tomlin, 1984) or after the presentation is completed (e.g., Chafe, 1980; Prideaux & Baker, 1988). In the former case, the subject is offering a "play-by-play" description, while in the latter, memory considerations loom large. It is within this latter methodology that the present study is situated.

Method. In the present study, a short (four minute) scene from the movie "Adam's Rib" was shown to subjects individually. After each viewing, the subject was asked to produce an oral narrative description of the events just seen. These were narrated to the experimenter, who was not in the room during the viewing, and the subject was instructed to tell the experimenter what had transpired in the scene in enough detail that the hearer could have a clear understanding of what had taken place. Subjects were urged to focus on a description of the events and not on the artistic merit of the scene. After the description was completed, the experimenter conducted a brief post-experimental interview, asking the subject specific questions concerning the scene. Both the narratives and the discussions were taped and subsequently transcribed. The transcriptions, which included such items

as false starts, hesitations, and pauses, were then extensively analyzed.

Subjects. Some 24 students, 16 male and eight female, volunteered to serve as subjects. All were university students, ranging in age from 19 to 45.

Coding. Several decisions were made concerning both transcription and coding of the data. It was decided to transcribe the tapes in conventional orthography, but to include hesitations, pauses, mispronunciations, etc. just as they occurred. A rough parsing of the cata into clauses was also undertaken, with special notations for various types of subordinate clauses (relative, complement, and adverbial).

Analysis: Once coded, the data were subjected to extensive analysis. All subordinate clauses were analyzed in terms of their positions within the main clause (internal or final) as well as in terms of whether they carried Given or New information. Given information was operationally defined as that which was (a) overtly present in the preceding context, (b) inferable from that context, or (c) pragmatically available. All other information was taken as New.

Since the GIVEN-NEW constraint makes two different predictions, one dealing with the relative order of constituents within clauses and one dealing with the informational status of main versus subordinate clauses, a test for each prediction was carried out. The first test focused on ditransitive verbs such as *give* which take both a direct and indirect object. Smyth, Prideaux, and Hogan (1979) and Smyth (1988), for example, found that if, in such structures, an information difference existed between the two objects, the first tended to be Given

and the second New, regardless of the grammatical roles of the two NPs. Accordingly, a tabulation was made of all such structures in these data, and the informational status of the two NPs was assessed.

The second test examined the information status of main versus subordinate complement, adverbial, and relative clauses. Complement clauses were analyzed both for informational status and for the roles they played in the host sentence (e.g., direct object), while adverbial clauses were analyzed in terms of whether they were finite or non-finite and whether or not ICONICITY was maintained in terms of the ordered events mentioned. Relative clauses were also assessed in terms of their information status, as well as for their position within the host clause, thereby permitting an assessment of both the GIVEN-NEW and CLOSURE predictions.

These data, pooled over the 24 subjects, permit a direct test of the predictions listed in Table 1, except for TRANSITIVITY. To test this last prediction, an independent means to determine the foregrounded events is necessary, since it is inadequate to use our own intuitions to determine which events are supposedly foregrounded, and then assess their representation against transitivity criteria. Accordingly, it was decided to exploit an operational definition of foregrounding proposed by Tjosvold (1989), who, in a similar study, treated those events overtly mentioned by three-fourths of the subjects as the "core foreground events." When the data from the 24 subjects were examined, six specific events were found to have been mentioned by 18 or more subjects. Once these events were isolated, the sentences representing each were carefully examined in terms of the major transitivity factors of aspect, tense, number of overt participants, and location in main or

subordinate clauses. In order to compare these results with background events, six other events from the scene, the "background control" set, were also examined in terms of the same factors.

The results of the text assessments were then tabulated and summarized. It is to a discussion of the results that we now turn.

Results

We first examine the results from the complement clauses. Of the 312 complement clauses in the pooled data, 307 were in final position, one was medial, and four were in initial position, strongly supporting the operation of CLOSURE. Moreover, 256 of the complements contained New information, while only 56 were Given. This result refutes the prediction that subordinate clauses will contain Given information more often than New. However, the result is less surprising when it is recognized that more than half of the complement clauses (namely 173) actually represented either direct or indirect quotations. Since such quotations are naturally understood as New, it is clear that the blanket generalization that all subordinate clauses are Given must be seriously questioned on both empirical and theoretical grounds. Finally, some 238 of the complement clauses served as direct objects, thereby maintaining the unmarked SVO order, while the remainder were distributed more or less evenly over other roles. From these data, then, support is gained for CLOSURE, and for MARKEDNESS, but not for the GIVEN-NEW constraint.

Of the 88 adverbial clauses, 66 were finite and 22 were non-finite. The predictions relating to CLOSURE, MARKEDNESS, ICONICITY (for those 27 finite and 5 non-finite clauses which coded ordered events), and the GIVEN-NEW constraint were tested for these data. The results for the two types are seen in Table 2.

Table 2. Adverbial Clause Data

	Position		Clause Order		Event Order		Given-New	
Type	Final	Non-Final	MC-SC	SC-MC	E1-E2	E2-E1	G	N
Finite	49	17	48	18	16	11	21	45
Non-Finite	17	5	18	4	1	4	5	17

These results provide strong support for CLOSURE and for MARKEDNESS, since there are significantly more final than non-final clauses (χ^2-tests for both types are significant, $p < .01$) and significantly more unmarked than marked clause orders (again, $p < .01$). However, ICONICITY is not significant for these data, and similarly, there are significantly *more* New than Given adverbial clauses, again refuting the GIVEN-NEW prediction for subordinate clauses. Here, as for the complements, the subordinate adverbials tend to introduce New information.

Of the 51 relative clauses found in the data, 49 were in final position, strongly supporting CLOSURE. However, only 15 relative clauses contained Given information while some 36 contained New. Once again the subordinate clauses tend to contain New rather than Given information ($\chi^2 = 10.2$, $p < .05$).

To this point prediction (b) for the GIVEN-NEW constraint is refuted since in no cases do subordinate clauses tend code primarily Given information and main clauses primarily New. When prediction (a) of the GIVEN-NEW constraint is examined, however, a different picture emerges. To examine information distribution within clauses, the 62 instances of ditransitive verbs with direct and indirect objects were analyzed. Of these, 40 occur within main clauses and 22 in subordinate

clauses. The results of the information distribution for these cases is found in Table 3.

Table 3. Given-New Distribution for Ditransitive Verbs

Clause Type	Total	+G-N	-G-N	X^2
Main	40	31	9	12.1***
Subordinate	22	12	10	ns

+G-N: GIVEN-NEW satisfied (e.g., V G-N)
-G-N: GIVEN-NEW not satisfied (e.g., V G-G, V N-N, V N-G)

For those ditransitive verbs residing in main clauses, the first postverbal NP (which is the indirect object in all cases) is significantly more often Given than New, while the second NP, the direct object, is significantly more often New than Given, thereby supporting GIVEN-NEW prediction (a). For those ditransitive verbs within subordinate clauses, however, we find that although the order of objects is typically IO-DO, there is no significant tendency for the GIVEN-NEW constraint to apply. Moreover, in those cases where the constraint is violated, it is typical that both NPs are Given (16 instances) rather than New (only 3 instances, $X^2 = 8.9$, $p < .01$). These results offer strong support for the GIVEN-NEW prediction (a) that within main, but not subordinate, clauses Given information tends to precede New.

Testing for TRANSITIVITY as a coding device for foregrounding is more complex than the previous tests. Foregrounded events are operationally defined as those mentioned by 75% of the subjects, and this includes six events in the film. The transitivity parameters chosen for analysis here were aspect, tense, clause location, and number of participants. These, unlike such other variables as telecity, can be

assessed by a direct inspection of the data, with no need for intuitive judgement concerning whether or not, for example, the action was completed at a given point. The results of this analysis are found in Table 4.

Table 4. Transitivity Tests

	-Aspect		+Aspect		Clause		Participants	
Event Type	Pres	Past	Prog	Perf	MC	SC	2+	1
Foreground	67	34	71	3	135	40	110	65
Background	46	19	4	0	66	3	35	34

Within these data, both those events operationally defined as foreground and as background tend to be found in the present tense more often than in the past tense. However, foreground events are far more often indicated by the presence of an aspect, typically a progressive, than are background. Moreover, foreground events tend to have more participants (NPs) in the host clause than do background events. Thus aspect and number of participants seem to be salient coding devices for foreground events, at least insofar as these events are operationally defined within these data.

Conclusions

The first goal of this paper was methodological in nature. We have succeeded in demonstrating that the method used here does elicit non-random results which can be interpreted in terms of the original hypotheses. According, the first goal has been met.

The second goal was to assess the extent to which certain comprehension-based constraints are also operative in language

production. Of those investigated, CLOSURE is supported in all cases. Similarly, for both adverbial and complement clauses, there is a strong preference for the unmarked order of MC+SC, thereby supporting the MARKEDNESS constraint. These results provide strong support for the role of *local* constraints within production.

However, when tested against ordered events represented by adverbial clauses, ICONICITY was not supported. While there were relatively few such instances (32) found in these data for the coding of ordered events, no preference emerged for the first event to be mentioned first. One possible reason for this is that for the structures analyzed, namely MC+SC and SC+MC, ICONICITY and MARKEDNESS can work either in concert or against one another. For example, when an initial main clause codes the first event and the subordinate the second, the two constraints work together. However, when an initial subordinate clause codes the first event, and the following main clause the second, they work against each other. Since the order MC+SC is dominant, MARKEDNESS overpowers ICONICITY when they work against each other. That is, the local constraint seems to dominate the more global one.

While strong support was found for the GIVEN-NEW constraint among NP constituents within main clauses, there is no support here for the claim that subordinate clauses code Given information. While main clauses may typically contain New information, it is not the case that subordinate clauses tend to carry Given information. The GIVEN-NEW constraint cannot be extended to all subordinate clauses as Bever (1970) proposed. Finer distinctions must be drawn among the functions of various types of subordinate clauses in order to examine their

information bearing role(s) more fully. For example, in Prideaux (1989), it is shown that within written texts, adverbial clauses tended to carry Given information.

Finally, it is apparent that of the dozen-odd transitivity features proposed by, e.g., Hopper and Thompson (1980), some correlate with foreground information, at least insofar as this notion is operationalized in the present study. However, Hopper's (1979) claim that foreground information tends to be encoded with perfective rather than progressive aspect is not borne out here. There remains the task of sharpening the foreground/background distinction further and then carefully assessing the possible devices.

In summary, it has been shown that several of the proposed constraints relevant in comprehension are also relevant in production. However, certain other constraints, namely the more global ones, appear to play less important roles here. Upon reflection, this last finding is not surprising. For example, ICONICITY is a means to match information to events. If the hearer already knows the normal order of such events, ICONICITY will provide no additional help. It is in just those cases where the order *cannot* be otherwise predicted that ICONICITY could facilitate processing; accordingly it would be useful to examine the effect of ICONICITY for both speakers and hearers in cases where no pragmatic information could otherwise determine the order of events. One would expect that in this, and perhaps only this, circumstance would ICONICITY emerge as a useful aid to comprehension.

As a final note, we observe that the production results suggest that the constraints operate in a hierarchic manner, with the local being stronger than the more global. This result mirrors, in fact, the

claim in Prideaux (1983) that in comprehension the more global constraints dominate the local ones. The issue of a possible hierarchic relation amongst the constraints clearly merits further investigation.

Notes

[1]An earlier version of this paper was presented at the Ninth World Congress of Applied Linguistics in Thessaloniki, Greece, April 16, 1990. I am grateful to those whose comments at that presentation helped me to improve and clarify the issues discussed here. I am also endebted to R. Dyck, K. Ursel, and E. Abraham for their diligent and patient efforts as research assistants in this study. Without their help, this project would not have been possible.

[2] The terms "principle," "constraint," and "strategy" are often used interchangably in the literature. For a discussion of the notion of a "strategy", see Prideaux and Baker (1986, Chapter 2). I will take the term "principle" to refer to those cognitive processing factors which in large part govern the way information of a variety of sorts is processed, while a "constraint" is understood to be a specific instantiation of such principles. Thus, the GIVEN-NEW constraint is a specific proposal as to how information flow is managed in discourse, and the underlying principles are (1) that information is not random but rather is systematically organized linguistically and (2) the initial and final (or stressed) parts of a *gestalt* are the most perceptually salient (accounting for the well-known recency and primacy effects from psychology). Similarly, the CLOSURE constraint is based upon the principles that (1) working memory is small, (2) serial rather than parallel semantic processing is preferred in assignment of argument structures for each predicate, (3) the syntactic "buffer" has a limited window, and (4) attention focus is restricted to one domain at a time.

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